

Sears

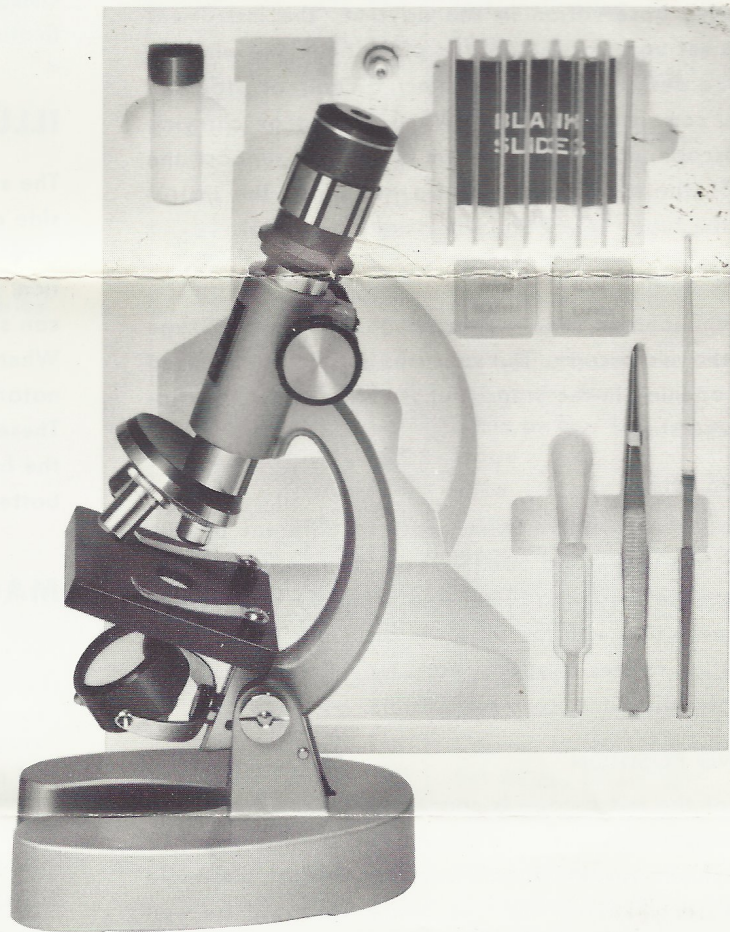
owners manual

**SEARS**  
**750x ZOOM MICROSCOPE SET**  
**100x - 750x**

49-2453

**CAUTION:**  
**Read Rules for**  
**Safe Operations**  
**and Instructions**  
**Carefully**

- Operation
- Repair Parts
- Accessories



All key numbers are  
illustrated and described  
on pages (4) and (5)

**SEARS, ROEBUCK AND CO., U.S.A.**

CHICAGO, ILL., 60684



## RULES FOR SAFE OPERATION

[1] Do not look into the microscope with the mirror directly reflecting the sunlight into the instrument, because such light is often too bright and may cause damage to your eyes.

[2] Be careful not to begin focusing by moving the body tube (#4) down or you may hit the slide with the objective lens (#31, #32) and break one or the other.

## PRELIMINARY WORK

### SETTING UP THE MICROSCOPE

For effective observation in the daytime, the instrument should be set up at a well-lighted place near the window. Use a large desk or table, and select a chair or stool on which you can sit comfortably. When moving or carrying the microscope, hold it by the arm (#11) and support the base (#15) with the other hand. Do not carry the instrument by the tube (#4) or the adjustment knob (#5).

### SPECIMEN SLIDE

A specimen-mounted slide is placed on the square stage (#28) of the microscope. The specimen should be centered over the opening in the stage. Put the slide under the clips (#29) on the stage.

### OBJECTIVE LENS

There are three objective lenses, each of different powers 10x (#33) 30x (#32), and 50x (#31) on the revolving turret (#34). Turn the revolving turret and bring the desired objective lens in line with the tube. It clicks into place. The magnification ranges available vary by different combinations of objective and eyepiece powers.

### ADJUSTING POSITION

The arm of the microscope is connected to the base with the inclination joint (#20) and you can tilt the instrument to any convenient position for observation. Adjust the angle of the mirror (#24) so that the entire view will be well lighted as you look into the eyepiece.

## FOCUSING

You should begin with the lowest magnification of both objective lens and eyepiece as focusing in the higher magnification requires more delicate manipulation of the instrument. Watching the instrument sideways, move the tube down until the objective is as close to the specimen as possible. Turn the zoom eyepiece to the lowest 10x position. Now looking into the eyepiece, raise the tube by turning the coarse adjustment knob (#5) as gently as possible until the specimen comes in focus.

Note that the image you see in the microscope is in reverse. So when you want to scan more toward the left you must move the slide to the right. Once desired part of the specimen is in view, turn the zoom eyepiece for higher magnification.

## ILLUMINATION

The substage illuminator (#23) consists of a mirror on one side and a battery-operated lamp (#22) on the other. The mirror is adjustable in any direction. For effective observation, the mirror should be positioned at an angle so that it can send up an ample amount of light into the instrument. When natural light is poor, you can switch to the illuminator that uses two AA batteries.

These batteries (not included in this set) are installed under the base as illustrated on page 5. The "+" end of the battery must go in the "+" end of the battery case.

## MAGNIFYING POWER OF MICROSCOPE

The magnifying power of a microscope is determined by the following formula.

$$\text{magnification of microscope} = \text{power of eyepiece} \times \text{power of objective}$$

If the zoom eyepiece is set at 10x while 10x objective is in use, the overall magnification of the microscope will be 100x. The highest magnification, 750x, is available using 50x objective with the eyepiece set at 15x. With the zoom eyepiece you can obtain any intermediate powers between 10x and 15x by simply rotating the eyepiece. This is a great advantage compared to the conventional microscope which requires a replacement of the eyepiece for a change of magnification.



# repair parts & accessories

## 100x - 750x ZOOM MICROSCOPE SET MODEL NUMBER 49-2453

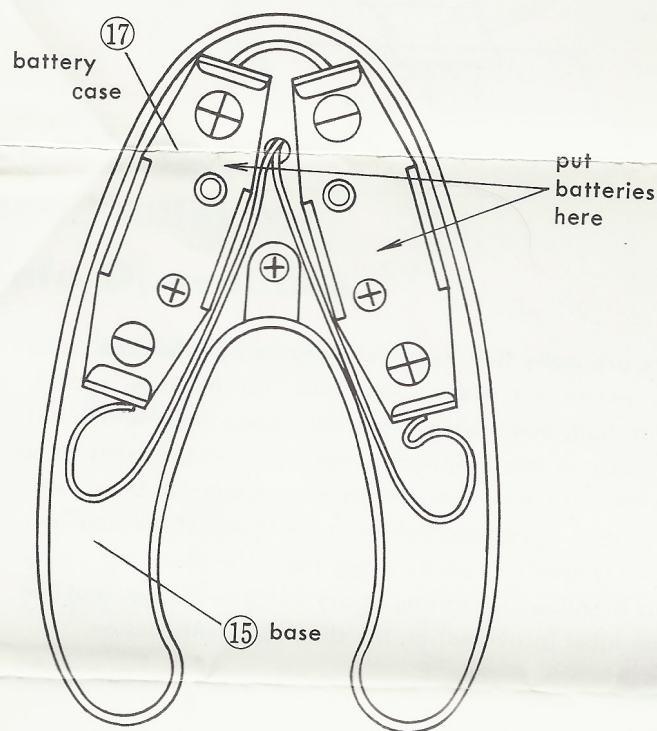
### ACCESSORIES:

This set contains: ★ 8 Blank slides      ★ 1 Glass rod  
 ★ 5 Blank labels      ★ 1 Eye dropper  
 ★ 5 Cover glasses      ★ 1 Empty bottle  
 ★ 1 Tweezers      ★ 1 Spare bulb

How to use these items is briefly explained below.

- ★ Blank slide: The specimen is mounted on these blank slides and observed under the microscope.
- ★ Cover glass: The specimen on the slide is normally covered and protected by a cover glass.
- ★ Blank label: Glued on each slide, the label may show the name of specimen, date, etc.
- ★ Tweezers: A useful tool in many ways.
- ★ Glass rod: Use to stir liquids.
- ★ Eye dropper: Use to transfer small amount of liquid.
- ★ Empty bottle: Liquid storage container

### UNDER THE BASE



### SPECIFICATIONS OF MICROSCOPE

- Inclinable monocular tube.
- Mechanical tube length: 118 mm.
- Diameter of tube: 19 mm.
- Eyepiece: Zoom 10x to 15x.
- Objective: Triple turret 10x, 30x, 50x.
- Built-in illuminator with a plane mirror.
- D.C. on two penlite batteries.
- Net weight: 16 oz.

### REPAIR PARTS

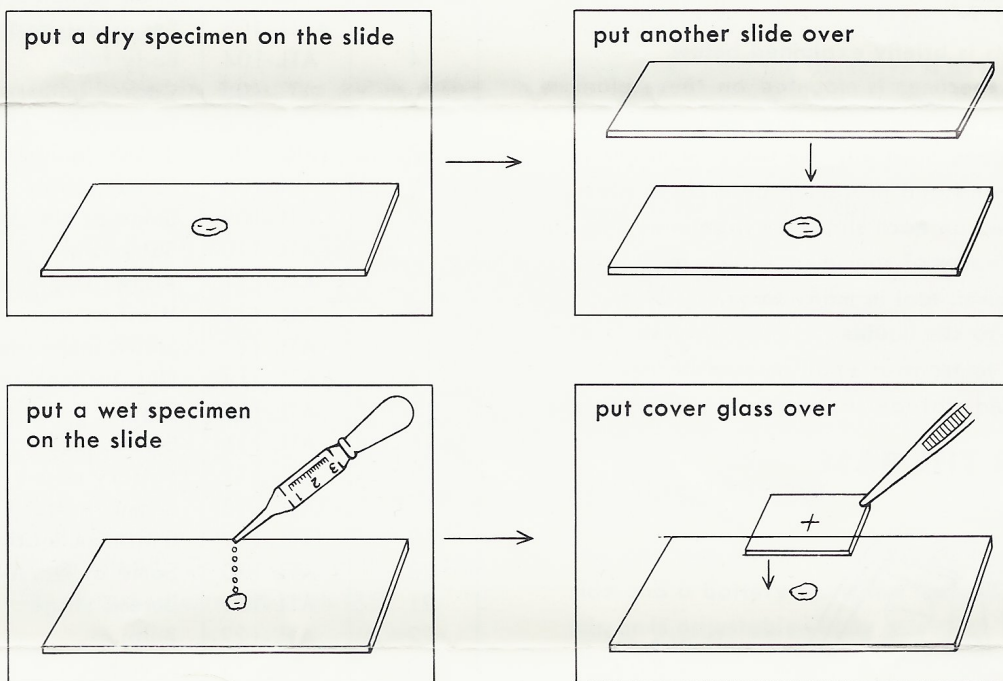
Key No.	Part No.	Description
1	ATL-101	Cap
2	ATZL-102	Zoom eyepiece, assembly
3	ATZL-103	Set screw, zoom eyepiece
4	ATL-104	Body tube
5	ATL-105	Coarse adjustment knob
6	ATL-106	Pinion holder
7	ATL-107	Screw, pinion holder
8	ATL-108	Shaft, pinion
9	ATL-109	Same as No. 5
10	ATL-110	Set screw
11	ATL-111	Arm
12	ATL-112	Washer, inclination
13	ATL-113	Shaft, inclination stop
14	ATL-114	Nut, inclination
15	ATL-115	Base
16	ATL-116	Screw, inclination stop
17	ATL-117	Battery case
18	ATL-118	Screw, battery case
19	ATL-119	Shaft, inclination
20	ATL-120	Same as No. 14
21	ATL-121	Screw, stage
22	ATL-122	Bulb
23	ATL-123	Illuminator assembly
24	ATL-124	Mirror
25	ATL-125	Fork, illumination assembly
26	ATL-126	Set screw, fork
27	ATL-127	Same as No. 12
28	ATL-128	Stage
29	ATL-129	Clips
30	ATL-130	Screw, clips
31	ATZL-131	Objective 50x
32	ATZL-132	Objective 30x
33	ATZL-133	Objective 10x
34	ATL-134	Revolving turret
35	ATL-135	Turret disc
36	ATL-136	Coil spring, click stop ball
37	ATL-137	Click stop ball, revolving turret
38	ATL-138	Set screw, Turret disc
39	ATL-139	Washer, revolving turret
40	ATL-140	Screw, revolving turret
41	ATZL-141	Name plate
	ATZL-142	Instruction booklet (Not illustrated)
A1	DK-1	Blank slide
A2	DK-2	Blank label
A3	DK-3	Cover glass
A4	DK-4	Tweezer
A5	DK-5	Glass rod
A6	DK-6	Eye dropper
A7	DK-7	Liquid storage container
A8	DK-8	Spare bulb



## HOW TO MAKE A TEMPORARY SLIDE

To make a quick microscopic observation of a specimen, make a temporary slide by simply placing the specimen in the middle of a blank slide. Then, place another blank slide over the first.

If your specimen is contained in a liquid, put a drop of the liquid on the blank slide and gently place a cover glass on the liquid with the tweezers. If air bubbles are trapped under the cover glass, press the cover glass softly with the tip of the tweezers to let the bubbles out.



## HOW TO MAKE A PERMANENT SLIDE

While a temporary slide is for one time use and is discarded after a session of microscopic study, permanent slides are prepared for the purpose of making a collection of slides that will be used repeatedly in the future.

Canada Balsam is a chemical that is required for making permanent slides. This Chemical is not included in this microscope set because it could be hazardous if misused. Have your parents obtain Canada Balsam for you from any local druggist and then you should use it only under their supervision.

There are many tiny, relatively, dry objects that can make easy permanent slides. They are, for instance, spores, grains, hair, insect wings, legs, etc. Allow them to dry out for a day or two before use, because if water exists in a specimen, the view through the microscope will be cloudy. Put a drop of Canada Balsam in the center of the slide and place the specimen on it. Apply the cover glass and gently press it. Allow the Balsam to dry out a few days. Put the blank label (provided) on the slide for identification.

